ENGINEERING MANAGEMENT SUPPORT INC.

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March 29, 2013

VIA: Electronic Mail

U.S. Environmental Protection Agency
Region 7 SUPR / MOKS
11201 Renner Boulevard
Lenexa, Kansas 66219

ATTENTION: Mr. Dan Gravatt

SUBJECT: Responses to MDNR Comments
Sampling and Analysis Plan Addendum
West Lake Landfill Operable Unit 1, Bridgeton, Missouri

Dear Mr. Gravatt,

On behalf of Cotter Corporation (N.S.L.), Bridgeton Landfill, LLC., Rock Road Industries, Inc., and the United Sates Department of Energy (the "Respondents"), Engineering Management Support Inc. (EMSI) submits the attached responses to the March 22, 2013 comments by the Missouri Department of Natural Resources (MDNR) on the Addendum to the Sampling and Analysis Plan. If you have any questions or desire additional information related to these responses to comments or any other aspect of the project, please do not hesitate to contact me.

Sincerely,
ENGINEERING MANAGEMENT SUPPORT, Inc.

Paul V. Rosasco, P.E.

Distribution:

Shawn Muenks - Missouri Dept of Natural Resources
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Responses to MDNR Comments on the
Sampling and Analysis Plan Addendum for the
2013 Groundwater Sampling Activities, West Lake Landfill Operable Unit -1

1. **Background Sampling** – Due to time required to identify, evaluate, select and obtain access to sample any suitable offsite wells, it was decided that sampling of offsite wells would not be included in the first (April) of the additional 2013 groundwater sampling events. It is our understanding that EPA is not requiring us to collect additional background data although EPA has indicated that obtaining such data could be useful to support our interpretation that the radionuclide levels identified in the site groundwater are consistent with naturally occurring levels of radionuclides. Therefore, we are working at identifying whether there are potentially suitable wells for sampling. With respect to the USGS wells identified by EPA, it is our understanding that EPA has not requested us or USGS to sample these wells. EPA has indicated to us that they only wanted to make us aware of the existence of these wells. At this time, we have not determined if these wells (which are located 7 to 22 miles from the site and potentially are completed in different hydrogeologic facies than those present at the site) are suitable to provide background data for the site. We have requested information regarding the geologic strata the wells are completed in and the construction details of the wells.

2. **Well Redevelopment** – The factors suggested by MDNR to identify wells for re-development were considered during the identification of the twelve wells proposed for re-development. The three wells where the dissolved fraction results for Radium-226 reportedly exceed the total fraction results for Radium-226 by the largest margin were PZ-101-SS, PZ-104-SD, and PZ-100-SS. PZ-101-SS is scheduled for redevelopment per the SAP addendum. Both PZ-104-SD and PZ-100-SS are part of the routine groundwater monitoring program for the permitted landfill and as such these wells were sampled using low-flow micropurging techniques using dedicated bladder pumps. Consequently, no re-development activities are proposed for these wells. The three wells where the dissolved fraction results for Radium-228 reportedly exceeded the total fraction results for Radium-228 by the largest margin were D-85, MW-104 and D-14. Both D-85 and MW-104 are scheduled for redevelopment per the SAP addendum. Due to the constriction in the well casing, D-14 cannot be redeveloped; however, well purging and sampling activities for this well are scheduled to start at the beginning of the April groundwater sampling event (subject to the additional discussion presented below) so as to allow the maximum amount of time possible for purging and stabilization of this well given the restrictions on water production imposed by the casing constriction.

   A Standard Operating Procedure (SOP) for well redevelopment is attached to this response to comments. Per MDNR's suggestion, weighted bailers will be used for the well redevelopment. Due to the potential for a surge block to damage the well screens of plastic-cased wells, we do not recommend use of a surge block.

3. **Sampling Flow Rates** – Wells that are included in the routine groundwater monitoring program for the permitted landfill are equipped with bladder pumps and as such are sampled using low-flow sampling techniques. The other wells will be sampled using the Waterra sytem which typically utilizes a relative low sampling rate (approximately less than a third of a gallon per minute based on the July 2012 purging information). Transducers are not considered necessary

for the goals of the project. Water levels are measured in each well immediately prior to initiating well purging and immediately prior to initiating sample collection, which provides sufficient information to identify the magnitude of drawdown that occurs in response to the purging process.

4. **Well D-14** – We concur that due to the casing constriction well D-14 is not optimal for groundwater sampling. There is no viable method for repairing this well. Consequently, we would be willing to abandon this well. Although the July 2013 water level for this well was 30.79 feet below the top of casing, the restriction in the wells casing was identified at a depth of 33 feet below the top of the casing. A peristaltic pump can only retrieve water to the depth of suction lift, estimated to be approximately 30 feet below ground surface. Consequently, a peristaltic pump will not provide any additional capabilities relative to purging of this well compared to the Waterra pump already installed in this well. Furthermore, by relying on suction lift, use of a peristaltic pump is not recommended for collection of samples for volatile organic compound analyses.

5. **Sample Collection and Handling Procedures** – Eberline Laboratory is providing one 2.5 gallon cubit container for collection of water for radionuclide analyses. Filtration of half of the water will then be performed at the analytical laboratory for samples to be analyzed for dissolved radionuclides. Both the filtered and unfiltered sample fractions will then be preserved by the laboratory. Filtration in the field will continued to performed for the trace metal dissolved sample fractions.

6. **Reporting** – We anticipate preparation of a data evaluation report once the final additional groundwater sampling event has been completed and the results reported to EPA.

Standard Operating Procedure for Monitoring Well Re-Development

Herst & Associates, Inc.
SOP – Well Development

March 2013
Revision 0

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1.0 PURPOSE

This document contains guidelines for the re-development of monitoring wells. The objective of well re-development is to provide groundwater that is as representative as possible of the aquifer that is communicating with the well.

2.0 SCOPE

This document applies to all Herst & Associates, Inc. personnel. This document, which constitutes a Standard Operating Procedure (SOP), describes acceptable methods for the development or re-development of wells and piezometers.

3.0 REQUIREMENTS

The following sections identify the personnel qualifications and equipment for the development of wells and piezometers.

3.1 Personnel Qualifications

Personnel performing these procedures are required to have completed the initial 40-hour OSHA classroom training that meets Department of Labor Regulation 29 CFR 1910.120(e)(3)(i), and must maintain a current training status by completing the appropriate eight (8)-hour OSHA refresher courses. Personnel must also have read and signed the appropriate Health and Safety Plan(s).

3.2 Equipment

The following is a list of basic equipment typically required when developing wells or piezometers. Additional equipment may be required in less typical applications, and will be specified in an approved project specific work plan or other appropriate document.

- Stop watch or other timepiece;
- Graduated purge water container;
- Disposable polyethylene bailer;
- Disposable nylon rope;
- Plastic sheeting;
- Containers for development water;
- Electronic water level sounder;
- Distilled or deionized water;
- Field book and/or field forms;
- Health and safety equipment and supplies;
- Calculator; and
- Waterproof pens.

4.0 RE-DEVELOPMENT PROCEDURES

Monitoring well re-development is the process by which particulates are removed from within and adjacent to the wells.

Development by bailers combines the positive aspects of surging with the positive aspects of sediment removal and is the preferred method for PVC monitoring wells in low yield wells. After lowering the bailer to the bottom of the well oscillate the bailer up and down using the rope to move water in and out of the well screen. After a few oscillations, pull the bailer from the well to remove water and sediment. Repeat this process until stabilization criteria are met as described in Section 4.1.

Use new disposable bailers and rope at each well. For wells with relatively long water columns (typically greater than fifty (50) feet of water column) it may be advantageous to use a weighted bailer. Pour development water into a graduated bucket to measure the volume of recovered water. Record turbidity at appropriate intervals (typically every 1/2–casing volume for wells that do not go dry) using a calibrated field turbidity meter. As necessary, transport development water to a centralized holding tank.

At the conclusion of re-development at each well, record the final water level along with date and time. Record the total volume of water recovered at each well.

4.1 Re-development Stabilization Criteria

The following stabilization criteria apply to monitoring well re-development:

- Turbidity values stabilize at less than or equal to five (5) NTUs;
- For shallow, low-yield wells that go dry during re-development, conduct repeated re-development until at least three (3) dry/recover cycles have been completed;
- For wells that do not purge dry but do not achieve firve (5) NTU turbidity, conduct re-development with at least five (5) casing volumes have been removed.

4.2 Casing Volume Calculation

- The height (H) of the groundwater column is determined by measuring the total depth (TD) of the well and subtracting the measured depth to static water level (MSD).
  - H (feet) = TD (feet) – MSD (feet)
  - Use the following formula to calculate the static well volume of groundwater:

    $V = 5.875 \times D^2 \times H$

    Where:

    V = well volume (gallons);

    D = inside well diameter (feet); and

    H = height of groundwater column (feet).

5.0 DOCUMENTATION

The following well development information will be recorded.

- Well or piezometer I.D.;
- Date(s) and time of well development;
- Well designation;
- Static water level from measuring point;
- Total depth from measuring point;
- Calculated well casing volume;
- Depth from top of well casing to top of sediment inside well, before and after development;
- Physical description of removed water throughout development (color and odor); and
- Quantity of water removed (incremental and total values).